IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	10/687,189
Applicant(s)	:	Nagarajan Subramaniyan
Filed:	:	10/16/2003
TC/A.U.	:	2141
Confirmation No.	:	7571
Examiner	:	SERRAO, RANODHI N.
Title	:	METHODS AND APPARATUS FOR OFFLOADING TCP/IP PROCESSING USING A PROTOCOL DRIVER INTERFACE FILTER

APPEAL BRIEF

MS APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir or Madam:

This brief is presented under 37 CFR § 41.37 in support of an appeal from a Final Office Action of 03/27/2007 regarding the above-identified application. Notice of the Appeal was filed under 37 CFR § 41.31 on 05/23/2007. This brief is accompanied by the fee set forth in 37 CFR § 41.20(b)(2).

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is Adaptec, Inc., a corporation established under the laws of the State of Delaware and having a principle place of business in Milpitas, California.

II. RELATED APPEALS AND INTERFERANCES

Applicants are unaware of any related appeal or interference.

III. STATUS OF CLAIMS

A. Total Claims: 1-24.

B. Current Status of Claims:

1. Claim canceled: none
2. Claims withdrawn: none
3. Claims pending: 1-24
4. Claims allowed: none
5. Claims rejected: 1-24

C. Claims on Appeal: 1-24

IV. STATUS OF AMENDMENTS

An Amendment with all compliances ("Amendment A") in response to a Non-Final Office Action was submitted on 02/05/2007. A Final Office Action was mailed on 03/27/2007. A Notice of Appeal was submitted on 05/23/2007 giving notice to appeal the rejections in the Final Office Action, and this Appeal Brief is in furthereance of the Notice of Appeal. The claims on appeals are those in the Amendment A.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Independent claim 1

Independent claim 1 is a method for establishing a connection between a first device and a second device, said first device comprising a first protocol driver, a first application, a first socket layer disposed between said first protocol driver and

said first application, and a first NIC driver, said second device comprising a second NIC driver (Paras. [0043], [0054], and [0057]; Figs. 3 and 4A-B), said method comprising: providing a first filter between said first socket layer and said first protocol driver, said first filter being external to said first NIC driver and first NIC hardware that is driven by said first NIC driver (Para. [0043]; Figs. 3 and 4A-B), providing a first offload hardware in said first device (Paras. [0043]-[0044]; Figs. 3), providing a second filter in said second device (Para. [0043]; Figs. 3 and 4A-B), receiving, using said first filter, a request from said first application through said first socket layer (Para. [0047]; Figs. 3 and 4A-C), examining, using said first filter, a transport handle in said request to determine whether said connection is an offload connection (Paras. [0046] and [0065]; Fig. 4C); processing said request to produce a packet set, said processing being performed by said first offload hardware if said connection is an offload connection, said processing being performed by said first protocol driver if said connection is not said offload connection, said packet set including one or more ordered packets (Para. [0047] and [0065]; Figs. 4C-D); sending, using said first NIC driver and said first NIC hardware, said packet set to said second device (Para. [0047]); determining, using said second NIC driver, whether said packet set contains an offload transport handle (Para. [0067], Fig. 4D); and passing said packet set to said second filter if said packet set contains said offload transport handle (Para. [0068]; Fig. 4D).

Claims 2-12, which are argued together with independent claim 1, depend directly or indirectly from independent claim 1 and incorporate all of the elements of independent claim 1, as described above.

B. Independent claim 13

Independent claim 13 is an apparatus comprising: an application (Paras. [0043], [0054], and [0057]; Figs. 3 and 4A-B); a socket layer (Paras. [0043], [0054], and [0057]; Figs. 3 and 4A-B), a filter configured to receive a request from said application through said socket layer and to examine a transport handle in said request for determining whether a connection pertaining to said request is an offload connection (Paras. [0043], [0046], [0054], [0057], and [0065]; Figs. 3 and 4A-C), a

protocol driver configured to process said request into a packet set if said connection is not said offload connection, said packet set including one or more ordered packets (Para. [0047] and [0065]; Figs. 4C-D); an offload hardware configured to process said request into said packet set if said connection is said offload connection (Paras. [0043]-[0044], [0047], and [0065]; Figs. 3 and 4C-D); a NIC driver configured to transmit said packet set (Paras. [0043]-[0047]; Figs. 3); and NIC hardware driven by said NIC driver (Paras. [0043]-[0047]; Figs. 3), wherein said filter is disposed between said socket layer and said protocol driver and external to said NIC driver and said NIC hardware (Paras. [0043]-[0044]; Figs. 3 and 4A-B).

Claims 14-24, which are argued together with independent claim 13, depend directly or indirectly from independent claim 13 and incorporate all of the elements of independent claim 13, as described above.

C. Dependent claims

Claim 2 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said second filter is provided between a second socket layer and a second protocol driver in said second device (Paras. [0043]-[0044]; Figs. 3 and 4A-B).

Claim 3 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said first offload hardware is implemented in said first NIC hardware (Para. [0044]).

Claim 4 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said processing is performed by said first protocol driver if said connection is an IPsec connection (Para. [0044]).

Claim 5 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said transport handle pertains to at least one of hardware capabilities of said first device and a routing table (Para. [0046]).

Claim 6 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein at least one of said first protocol driver and said second protocol is configured for processing a transport protocol (Para. [0044]).

Claim 7 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein at least one of said first protocol driver and said second protocol is configured for processing TCP (Para. [0044]).

Claim 8 is a dependent claim to independent claim 1 and recites the method of claim 1, at least one of said first protocol driver and said second protocol is configured for processing IP (Para. [0044]).

Claim 9 is a dependent claim to independent claim 1 and recites the method of claim 1 further comprising providing a second offload hardware in said second device, said second offload hardware configured for re-assembling said packet set into a data stream (Para. [0047]).

Claim 10 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said determining includes detecting at least one of a connection establishment handshake and a handshake termination between said first device and said second device (Para. [0046]).

Claim 11 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said determining includes using said second filter (Paras. [0057]-[0058]).

Claim 12 is a dependent claim to independent claim 1 and recites the method of claim 1, wherein said first protocol driver is supplied with an operating system of said first device and without being modified (Paras. [0044] and [0052]).

Claim 14 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said filter is included in an operating system of said apparatus (Paras. [0044] and [0052]).

Claim 15 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said offload hardware is implemented in said NIC hardware (Para. [0044]).

Claim 16 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said protocol driver is configured to process said request if said connection is an IPsec connection (Para. [0044]).

Claim 17 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said transport handle pertains to at least one of hardware capabilities of said apparatus and a routing table (Para. [0046]).

Claim 18 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said offload hardware is configured to process a transport protocol (Para. [0044]).

Claim 19 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said offload hardware is configured to process TCP (Para. [0044]).

Claim 20 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said offload hardware is configured to process IP (Para. [0044]).

Claim 21 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said offload hardware is further configured to re-assemble an incoming packet set into a data stream, said incoming packet set including one or more packets (Para. [0047]).

Claim 22 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said NIC driver is further configured to determine whether an incoming packet set contains an offload transport handle and to, if said incoming packet set contains said offload transport handle, pass said incoming packet set to said filter (Para. [0046]).

Claim 23 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said filter is further configured to determine whether an incoming packet set contains an offload transport handle (Para. [0046]).

Claim 24 is a dependent claim to independent claim 13 and recites the apparatus of claim 13, wherein said protocol driver is included in an operating system of said apparatus without being modified (Paras. [0044] and [0052]).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether or not claims 1-24 are unpatentable under 35 U.S.C. 103(a) over Boucher et al. (US Patent No. 6,247,060), hereinafter "Boucher", in view of Anand

et al. (US Patent Application No. 2002/0062333), herein after "Anand".

VII. ARGUMENT

Rejections under USC § 103

A rejection under 35 USC § 103(a) requires that the combined references suggest the claimed combination. (MPEP 706 and 2141 et seq.). Under the Graham test, three factors must be evaluated: the scope and content of the prior art; the differences between the prior art and the claimed invention; and the level or ordinary skill in the art. (MPEP 706 and 2141 et seq.).

Independent Claims 1 and 13

On page 2 of the Final Office Action, the Examiner argues that claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher and Anand.

On pages 2-3 of the Final Office Action, the Examiner argues that, as per claim 1, Boucher teaches a method for establishing a connection between a first device and a second device, said first device comprising a first protocol driver, a first application, a first socket layer disposed between said first protocol driver and said first application, and a first NIC driver, said second device comprising a second NIC driver (see Boucher, col. 20, lines 10-35), said method comprising: providing a first filter between said first socket layer and said first protocol driver (see Boucher, col. 53, lines 19-30), said first filter being external to said first NIC driver and first NIC hardware that is driven by said first NIC driver (see Boucher, col. 53, lines 31-47); providing a first offload hardware in said first device (see Boucher, col. 24, lines 52-58); providing a second filter in said second device (see Boucher, col. 14, line 57-col. 15, line 6); receiving, using said first filter, a request from said first application through said first socket layer (see Boucher, col. 53, lines 35-54); examining, using said first filter, a transport handle in said request to determine whether said connection is an offload connection '(see Boucher, col. 53, line 55-col. 54, line 29).

On page 3 of the Final Office Action, the Examiner argues that Boucher fails to teach processing said request to produce a packet set, said processing being performed by said first offload hardware if said connection is an offload connection, said processing being performed by said first protocol driver if said connection is not said offload connection, said packet set including one or more ordered packets; sending, using said first NIC driver and said first NIC hardware, said packet set to said second device; determining, using said second NIC driver, whether said packet set contains an offload transport handle; and passing said packet set to said second filter if said packet set contains said offload transport handle.

On page 3 of the Final Office Action, the Examiner argues that, however, Anand teaches processing said request to produce a packet set, said processing being performed by said first offload hardware if said connection is an offload connection (see Anand, Para. 41), said processing being performed by said first protocol driver if said connection is not said offload connection, said packet set including one or more ordered packets (see Anand, Para. 43); sending, using said first NIC driver and said first NIC hardware, said packet set to said second device (see Anand, Para. 53); determining, using said second NIC driver, whether said packet set contains an offload transport handle (see Anand, Para. 54); and passing said packet set to said second filter if said packet set contains said offload transport handle (see Anand, Para. 58).

On page 3-4 of the Final Office Action argues that it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Boucher to processing said request to produce a packet set, said processing being performed by said first offload hardware if said connection is an offload connection, said processing being performed by said first protocol driver if said connection is not said offload connection, said packet set including one or more ordered packets; sending, using said first NIC driver and said first NIC hardware, said packet set to said second device; determining, using said second NIC driver, whether said packet set contains an offload transport handle; and passing said packet set to said second filter if said packet set contains said offload transport handle in order to free up host processor resources and increasing the overall efficiency of the computer system

(see Anand, Para. 3).

On pages 6-7 of the Final Office Action, the Examiner argues against claim 13 based on the same reasons applied in arguing against claim 1.

Applicants respectfully traverse the rejections and wish to point out that for various reasons each of claims 1 and 13 is novel, non-obvious, and patentable over the cited art of record, taken alone or in combination. The reasons may include, for example, deficiency of Boucher and failure of Anand in curing the deficiency of Boucher, discussed below.

Deficiency of Boucher

In addition to the failure/deficiency of Boucher pointed out by the Examiner, Boucher has further deficiency in view of each of claims 1 and 13.

For example, each of claims 1 and 13 requires the feature of providing a first filter between the first socket layer and the first protocol layer.

Boucher teaches a filter driver at the top of the TCP/IP protocol stack (Col. 32, Lines 25-33) or attached on top of a TCP/IP driver. Boucher also teaches a TDI filter driver and upper interface 380 between a TDI user 382 and ATCP driver [370] (Fig. 9; Col. 15, Lines 1-6). However, Boucher does not teach the relation between a filter and a socket layer. In the arrangement taught by Boucher, the TDI filter driver and upper interface 380 may be a combined filter-socket component, without a filter being provided between a socket layer and protocol layer.

Further, each of claims 1 and 13 requires the feature of examining, using the first filter, a transport handle in the request to determine whether the connection is an offload connection.

In contrast, Boucher teaches that it is not always possible to tell whether the connection should be handled by a filter driver or the Microsoft driver (Col. 53, Lines 39-42). Boucher teaches higher-level TDI client software which requires services from a protocol driver proceeds by creating various types of NT FILE-OBJECTs, and then making various DEVICE_IO_CONTROL requests on these FILE_OBJECTS (Col. 53, Lines 48-54). Boucher does not teach a transport handle, i.e., a unique identifier or pointer used to access an object (according to [0015] of

this application), in a request. Boucher teaches there are difficulties when "we" examine the ADDRESS object to see if it was "one or ours" or not (Col 54, Lines 1-41). Boucher does not teach examining a transport handle in a request using a filter.

Failure of Anand in Curing the Deficiency of Boucher

For various reasons, even if the teachings of Boucher are combined with the teachings of Anand, Anand does not cure the deficiency of Boucher, and the combined teachings do not teach all the features/limitations of either of claims 1 and 13.

For example, each of claims 1 and 13 includes the feature of processing the request to produce a packet set, the processing being performed by the first offload hardware if the connection is an offload connection, the packet set including one or more ordered packets. The offload hardware is different from the first NIC hardware in each of claim 1 and 13.

In contrast, Anand teaches that transport protocols allocate packets and copy data from the sending application into the packet. Anand also teaches that a task, such as checksum calculation and comparison, may be performed on the packet (but not the request) by transport protocol drivers or offloaded to the NIC hardware. Anand teaches that the NIC hardware may process the packet, but not the request from the sending application. Further, Anand does not teach that the packet includes one or more ordered packets.

For the aforementioned reasons and others, it is respectfully submitted that each of claims 1 and 13 is novel, nonobvious, and patentable over the cited art of record, taken alone or in combination.

Dependent Claims 2-24

The dependent claims 2-24 are patentable not only due to their dependency on at least one of patentable parent claims 1 and 13 but also may due to their recitations of independently patentable features.

For the aforementioned reasons and others, it is respectfully submitted that the pending claims are novel, non-obvious, and patentable over the cited art of record, taken alone or in combination. It is respectfully requested that the rejections of the pending claims be withdrawn.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner and/or members of the Board are invited to telephone Applicant's attorney Joseph A. Nguyen at (408) 213-9540 to facilitate this appeal.

At any time during the pendency of this application, please charge any additional fees or credit overpayment to the Deposit Account No. 502284.

Respectfully Submitted,
Nagarajan Subramaniyan

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07/23/2007
Date:

VIII. CLAIMS APPENDIX

1. (Previously presented) A method for establishing a connection between a first device and a second device, said first device comprising a first protocol driver, a first application, a first socket layer disposed between said first protocol driver and said first application, and a first NIC driver, said second device comprising a second NIC driver, said method comprising:

providing a first filter between said first socket layer and said first protocol driver, said first filter being external to said first NIC driver and first NIC hardware that is driven by said first NIC driver;

providing a first offload hardware in said first device;

providing a second filter in said second device;

receiving, using said first filter, a request from said first application through said first socket layer;

examining, using said first filter, a transport handle in said request to determine whether said connection is an offload connection;

processing said request to produce a packet set, said processing being performed by said first offload hardware if said connection is an offload connection, said processing being performed by said first protocol driver if said connection is not said offload connection, said packet set including one or more ordered packets;

sending, using said first NIC driver and said first NIC hardware, said packet set to said second device;

determining, using said second NIC driver, whether said packet set contains an offload transport handle; and

passing said packet set to said second filter if said packet set contains said offload transport handle.

2. (Previously presented) The method of claim 1, wherein said second filter is provided between a second socket layer and a second protocol driver in said second device.

3. (Previously presented) The method of claim 1, wherein said first offload hardware is implemented in said first NIC hardware.

4. (Previously presented) The method of claim 1, wherein said processing is performed by said first protocol driver if said connection is an IPsec connection.

5. (Previously presented) The method of claim 1, wherein said transport handle pertains to at least one of hardware capabilities of said first device and a routing table.

6. (Previously presented) The method of claim 1, wherein at least one of said first protocol driver and said second protocol is configured for processing a transport protocol.

7. (Previously presented) The method of claim 1, wherein at least one of said first protocol driver and said second protocol is configured for processing TCP.

8. (Previously presented) The method of claim 1, at least one of said first protocol driver and said second protocol is configured for processing IP.

9. (Previously presented) The method of claim 1 further comprising providing a second offload hardware in said second device, said second offload hardware configured for re-assembling said packet set into a data stream.

10. (Previously presented) The method of claim 1, wherein said determining includes detecting at least one of a connection establishment handshake and a handshake termination between said first device and said second device.

11. (Previously presented) The method of claim 1, wherein said determining includes using said second filter.

12. (Previously presented) The method of claim 1, wherein said first protocol driver is supplied with an operating system of said first device and without being modified.

13. (Previously presented) An apparatus comprising:

an application;

a socket layer;

a filter configured to receive a request from said application through said socket layer and to examine a transport handle in said request for determining whether a connection pertaining to said request is an offload connection;

a protocol driver configured to process said request into a packet set if said connection is not said offload connection, said packet set including one or more ordered packets;

an offload hardware configured to process said request into said packet set if said connection is said offload connection;

a NIC driver configured to transmit said packet set; and

NIC hardware driven by said NIC driver,

wherein said filter is disposed between said socket layer and said protocol driver and external to said NIC driver and said NIC hardware.

14. (Previously presented) The apparatus of claim 13, wherein said filter is included in an operating system of said apparatus.

15. (Previously presented) The apparatus of claim 13, wherein said offload hardware is implemented in said NIC hardware.

16. (Previously presented) The apparatus of claim ~~3~~ 13, wherein said protocol driver is configured to process said request if said connection is an IPsec connection.

17. (Previously presented) The apparatus of claim 13, wherein said transport handle pertains to at least one of hardware capabilities of said apparatus and a routing table.

18. (Previously presented) The apparatus of claim 13, wherein said offload hardware is configured to process a transport protocol.

19. (Previously presented) The apparatus of claim 13, wherein said offload hardware is configured to process TCP.

20. (Previously presented) The apparatus of claim ~~7~~ 13, wherein said offload hardware is configured to process IP.

21. (Previously presented) The apparatus of claim 13, wherein said offload hardware is further configured to re-assemble an incoming packet set into a data stream, said incoming packet set including one or more packets.

22. (Previously presented) The apparatus of claim 13, wherein said NIC driver is further configured to determine whether an incoming packet set contains an offload transport handle and to, if said incoming packet set contains said offload transport handle, pass said incoming packet set to said filter.

23. (Previously presented) The apparatus of claim 13, wherein said filter is further configured to determine whether an incoming packet set contains an offload transport handle.

24. (Previously presented) The apparatus of claim 13, wherein said protocol driver is included in an operating system of said apparatus without being modified.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None